WHAT IS CLAIMED IS:

1. A method for reconstructing an image from its halftone version using information obtained from a dither matrix used to generate the halftone version, comprising the steps of:

(a) determining a bounding region defined by (x_{min}, x_{max}) for each pixel location and color value, based on the information obtained from the dither matrix;

(b) applying a low-pass filter to the halftone version, such that for each pixel, the reconstructed color is

(b)(1) the filtered value, if the filtered value is greater than or equal to x_{min} and less than or equal to x_{max},

(b)(2) the x_{min} value, if the filtered value is less than x_{min}, and

(b)(3) the x_{max} value, if the filtered value is greater than x_{max}; and

(c) for each pixel, determining whether its value for that color is to be used in an averaging process based on the distance between the bounding region of that pixel and neighborhood pixels' bounding regions.

2. The method of claim 1, further comprising the step of adding some high frequency content to the reconstructed image.

3. The method of claim 1, further comprising the step of performing color adjustment on the reconstructed image using an inverse look-up table.

4. The method of claim 1, further comprising the step of performing color adjustment on the reconstructed image using a 1-D histogram for each pixel color.

5. An apparatus for reconstructing an image from its halftone version using information obtained from a dither matrix used to generate the halftone version, comprising:

means for determining a bounding region defined by (x_{min}, x_{max}) for each pixel color value, based on the information obtained from the dither matrix;

a low-pass filter for filtering the halftone version, such that for each pixel, the reconstructed color is the filtered value, if the filtered value is greater than or equal to x_{min} and less than or equal to x_{max}, the x_{min} value, if the filtered value is less than x_{min}, and the x_{max} value, if the filtered value is greater than x_{max}; and

means for determining, for each pixel, whether its value for that color is to be used in an averaging process based on the distance between the bounding region of that pixel and an adjacent pixel bounding region.

6. The apparatus of claim 5, wherein some high frequency content is added to the reconstructed image.

7. The apparatus of claim 5, wherein color adjustment is performed on the reconstructed image using an inverse look-up table or a 1-D histogram for each pixel color.

8. A machine-readable medium having a program of instructions for directing a machine to reconstruct an image from its halftone version using information obtained from a dither matrix used to generate the halftone version, the program of instructions comprising:

(a) instructions for determining a bounding region defined by (x_{min}, x_{max}) for each pixel location and color value, based on the information obtained from the dither matrix;

(b) instructions for applying a low-pass filter to the halftone version, such that for each pixel, the reconstructed color is

(b)(1) the filtered value, if the filtered value is greater than or equal to x_{min} and less than or equal to x_{max},

(b)(2) the x_{min} value, if the filtered value is less than x_{min}, and

(b)(3) the x_{max} value, if the filtered value is greater than x_{max}; and

(c) instructions for determining, for each pixel, whether its value for that color is to be used in an averaging process based on the distance between the bounding region of that pixel and neighborhood pixels' bounding regions.

9. The machine-readable medium of claim 8, further comprising instructions for adding some high frequency content to the reconstructed image.

10. The machine-readable medium of claim 8, further comprising instructions for performing color adjustment on the reconstructed image using an inverse look-up table.

11. The machine-readable medium of claim 8, further comprising instructions for performing color adjustment on the reconstructed image using a 1-D histogram for each pixel color.